



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/005,861	11/08/2001	Daniel C. Edelstein	FIS9-2001-0156	2803

7590 05/04/2004

Philmore H. Colburn II  
Cantor Colburn LLP  
55 Griffin Road South  
Bloomfield, CT 06002

EXAMINER

FULLER, ERIC B

ART UNIT PAPER NUMBER

1762

DATE MAILED: 05/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/005,861

Applicant(s)

EDELSTEIN ET AL.

Examiner

Eric B Fuller

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4 and 6-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 18, 2004 has been entered.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4, 6-10, and 12-19 rejected under 35 U.S.C. 102(e) as being anticipated by Cheung et al. (US 6,348,725 B2).

Cheung teaches a process of forming a hydrogenated oxidized silicon carbon film (column 5, lines 23-30) by PECVD (column 14 line 7). The reference reads on the applicant's precursors (tables; column 15 lines 4-13), temperature (column 6, lines 30-

Art Unit: 1762

37), parallel plate reactor (column 8, lines 25-30), carrier gases (column 12, line 25), flow ratios (example), and dielectric constant (column 19, lines 1-4). The reference teaches that the oxidizer source may be carbon dioxide (column 6, lines 10-12). Thus, the reference anticipates using carbon dioxide, by itself, as the oxidizer. Using carbon dioxide as the only oxidizing source reads on the applicant's limitation of "substantially free of nitrogen".

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4 and 6-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grill et al. (US 6,147,009) in view of Cheung et al. (US 6,348,725 B2).

Grill teaches a process of forming a hydrogenated oxidized silicon carbon film (column 4, lines 65-66) by PECVD (column 5, line 19). The reference reads on the applicant's precursors (column 3, lines 15-30), temperature (column 3, lines 30-35), annealing (column 3, lines 10-15), parallel plate reactor (column 3, lines 1-5), carrier gases (column 6, line 64), flow ratios (column 6, lines 25-35), and dielectric constant (column 6, line 12). The reference teaches that the oxidizer source is "at least one member selected from the group consisting of hydrogen, oxygen, germanium, nitrogen

Art Unit: 1762

and fluorine containing gases" (column 10, lines 59-62). The reference fails to teach the use of carbon dioxide as the oxidizer.

However, Cheung teaches that carbon dioxide may be used as the oxidizer as it acts to control the carbon content in the deposited film (column 6, lines 8-37). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize carbon dioxide as the oxygen source in the process taught by Grill. By doing so, one would reap the benefits of controlling the carbon content in the film.

Claims 1-4 and 7-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Loboda et al. (US 6,159,871), in view of Cheung et al. (US 6,348,725 B2).

Loboda teaches a method of depositing a HSiOC film by PECVD (abstract). Methylsilane may be the precursor (column 2, line 57). The temperature is within the applicant's range (column 3, line 26). The dielectric constant of the resulting film is within the applicant's range (tables). The process is performed in a parallel plate reactor (column 4, lines 45-50). Argon may be used as a diluent gas (column 3, lines 13-15). The oxidizer flow rate is within the applicant's range (column 3, lines 4-10). The annealing step is taught (tables). The reference teaches that the "oxygen providing gases include, but are not limited to air, ozone, oxygen, nitrous oxide, and nitric oxide, preferably nitrous oxide" (column 3, lines 1-5). The reference fails to teach the use of carbon dioxide as the oxidizer.

However, Cheung teaches that carbon dioxide may be used as the oxidizer as it acts to control the carbon content in the deposited film (column 6, lines 8-37). It would

Art Unit: 1762

have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize carbon dioxide as the oxygen source in the process taught by Loboda. By doing so, one would reap the benefits of controlling the carbon content in the film.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Loboda et al. (US 6,159,871) in view of Cheung et al. (US 6,348,725 B2), as applied to claim 1 above, and further in view of Lagendijk (US 5,028,566).

Loboda, in view of Cheung, teaches the limitations of claim 1, as shown above, but is silent to the teaching of using tetramethylcyclotetrasiloxane (TMCTS) as the precursor. However, Lagendijk teaches using TMCTS as a precursor provides high conformity with a low deposition temperature (column 5, lines 39-45). Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to use TMTCTS in the process taught by Loboda. By doing so, one would reap the benefits of high conformity with a low deposition temperature.

### ***Response to Arguments***

Applicant argues that the cited prior art fails to teach all the limitations of the claims, as they have been amended. Examiner agrees and has withdrawn the rejections of the previous Office Action accordingly. However, applicant's arguments are moot in view of the new grounds of rejection.

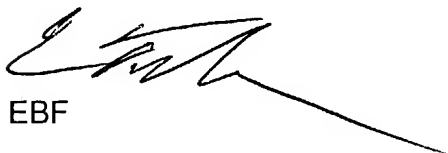
Art Unit: 1762

**Conclusion**

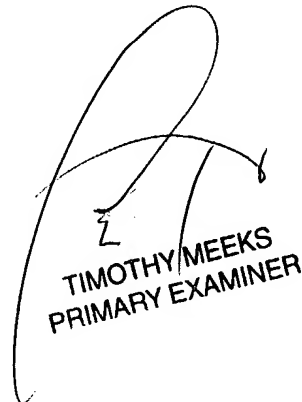
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric B Fuller whose telephone number is (571) 272-1420. The examiner can normally be reached on Mondays through Thursdays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P Beck, can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



EBF



TIMOTHY MEEKS  
PRIMARY EXAMINER